Summary of electron response at phi crack

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Event Selection

- MC : 1 million zewkae (Z→ee)
- Data : bhel0d (single high pt electron)
- Require one electron by em object and the other track to reconstruct Z. (tower 1~8)
- No background assumed.
- Central tight electron cut on electron leg, pt > 20 GeV cut instead of et cut
- Cuts for the other track(2x2 Energy used):

Opposite charge to electron's,   Had/Em < 0.5
E/p < 1.2, pt > 20 GeV, No other track within 0.4 cone
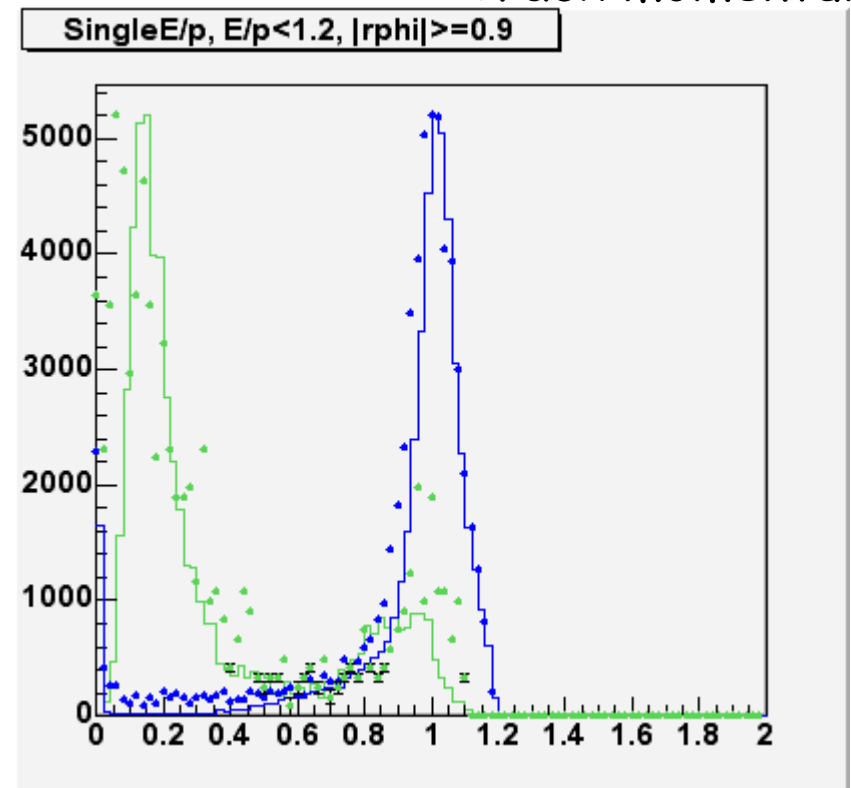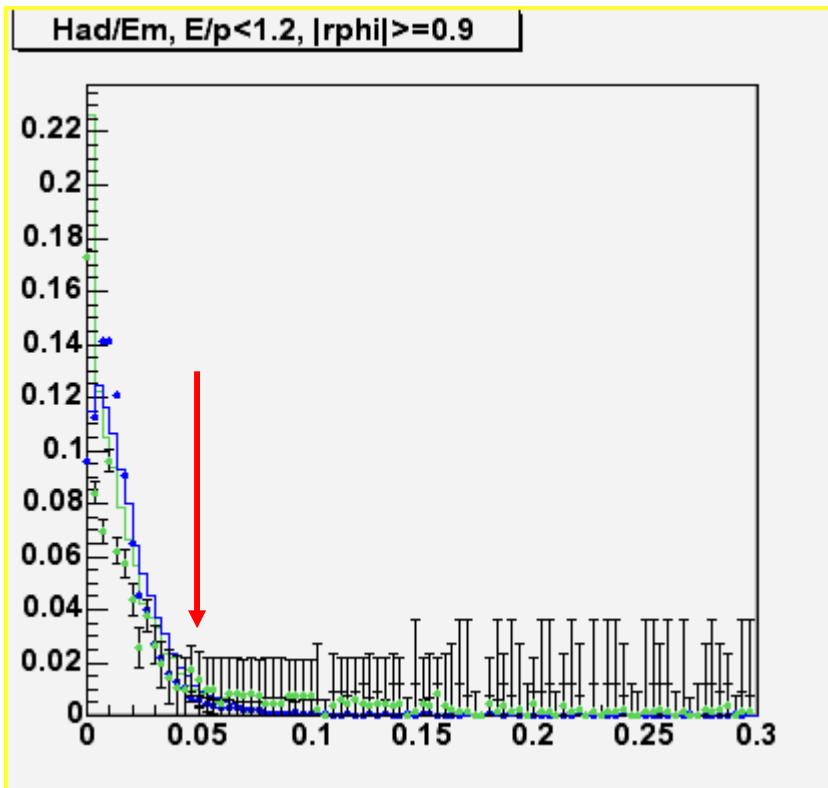
Track Had/Em & E/p distribution

Blue : track |relative phi|<0.9
Green : track |relative phi|>=0.9
Data in marker while MC in line

Single tower E
———————————
Track momentum

Z mass after selection cut

Monte Carlo
Data

M(Z), 2x2E — Energy 4-vec
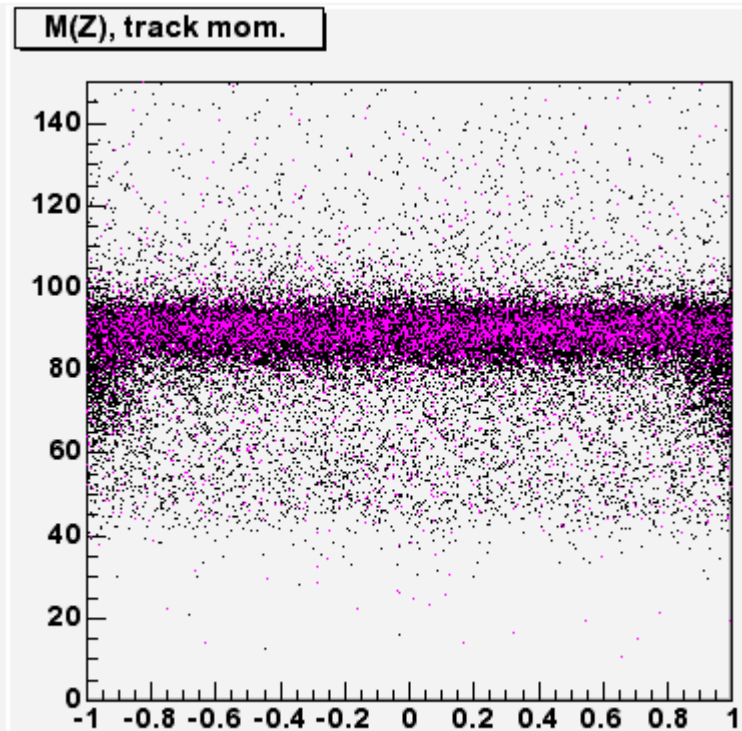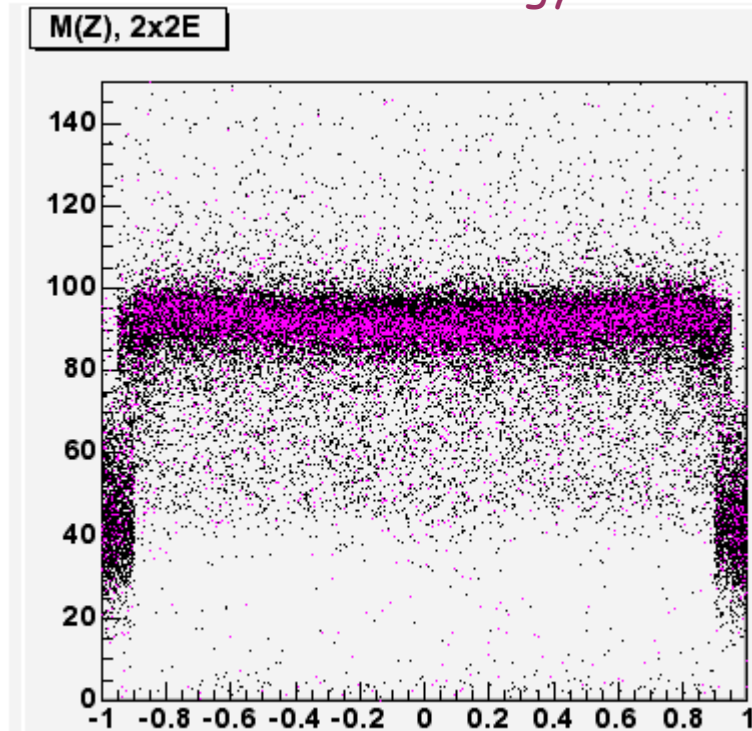
M(Z), track mom. — Momentum 4-vec
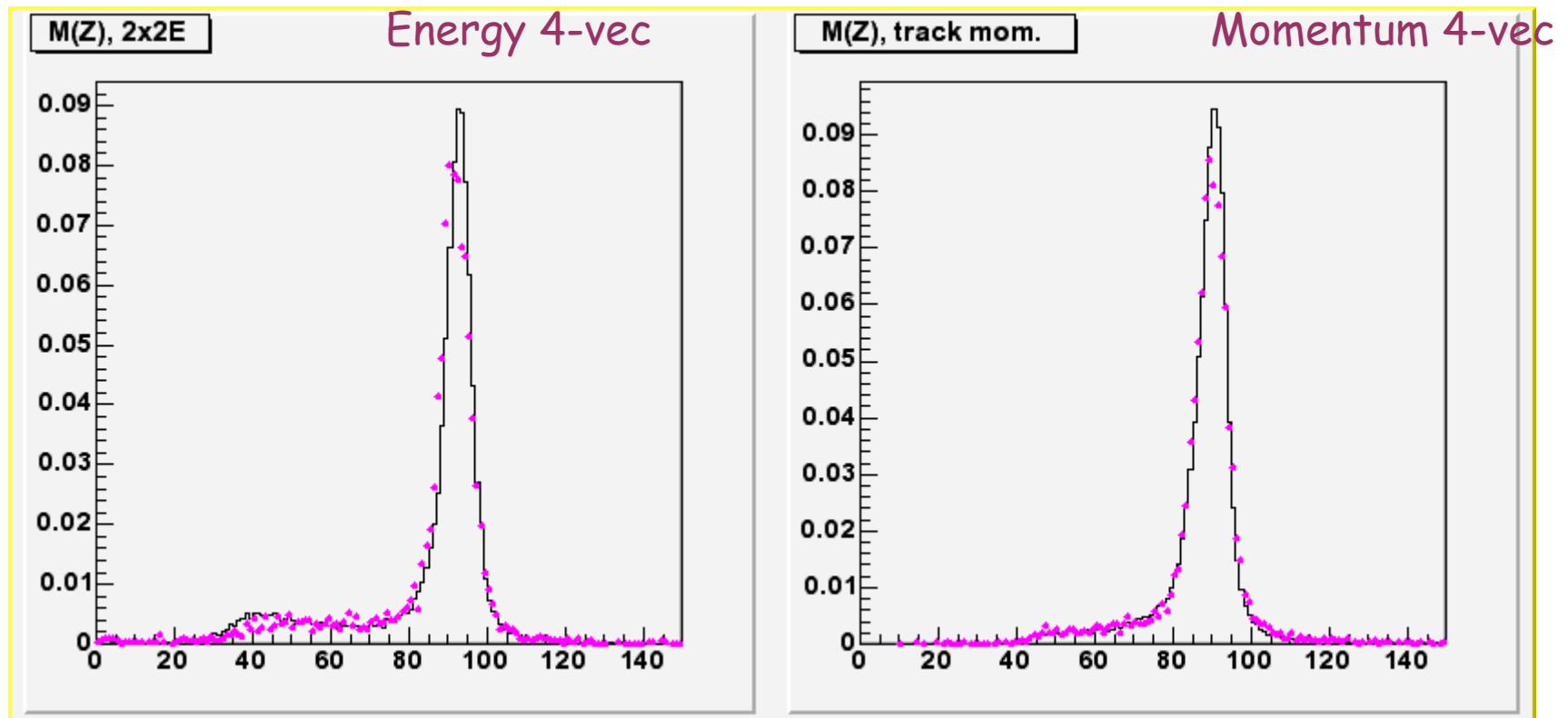
Z mass vs. relative phi in tower

Monte Carlo
Data

Energy 4-vec

Momentum 4-vec

Z mass distribution

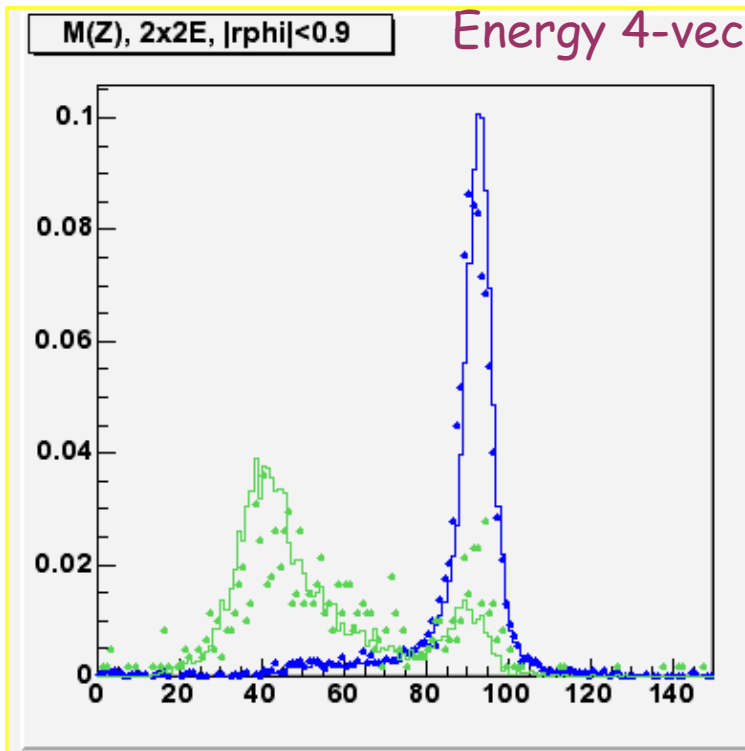Blue : track |relative phi|<0.9
Green : track |relative phi|>=0.9
Data in marker while MC in line

Momentum 4-vec

Energy 4-vec

M(Z), 2x2E, |rphi|<0.9

M(Z), track mom., |rphi|<0.9
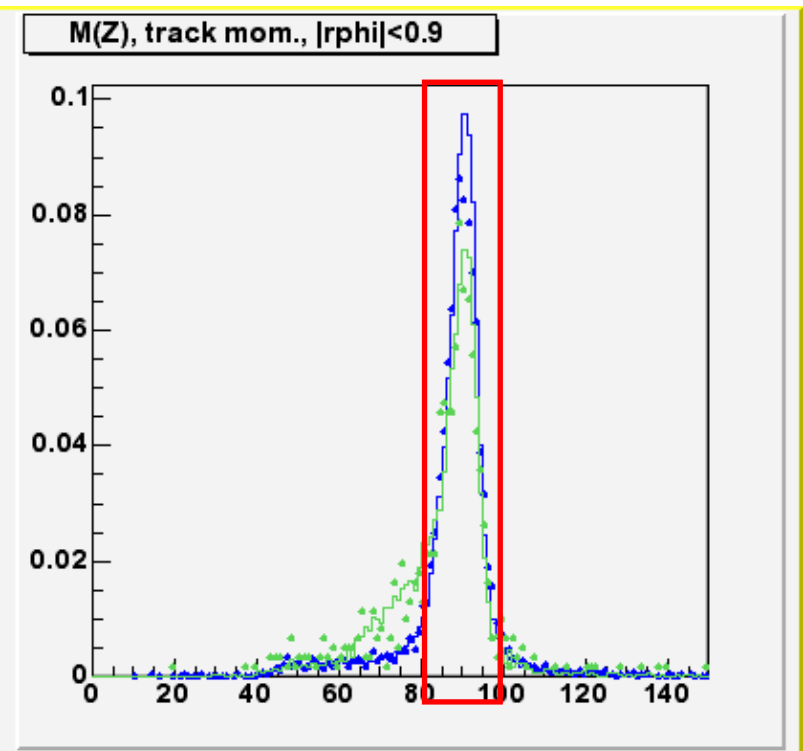
Selection region

E/p vs relative position

@ Good region required:
  - for E/p vs. rel. phi, |reta|<0.5 used.
  - for E/p vs. rel. eta, |rphi|<0.5 used.
@ Relative position?
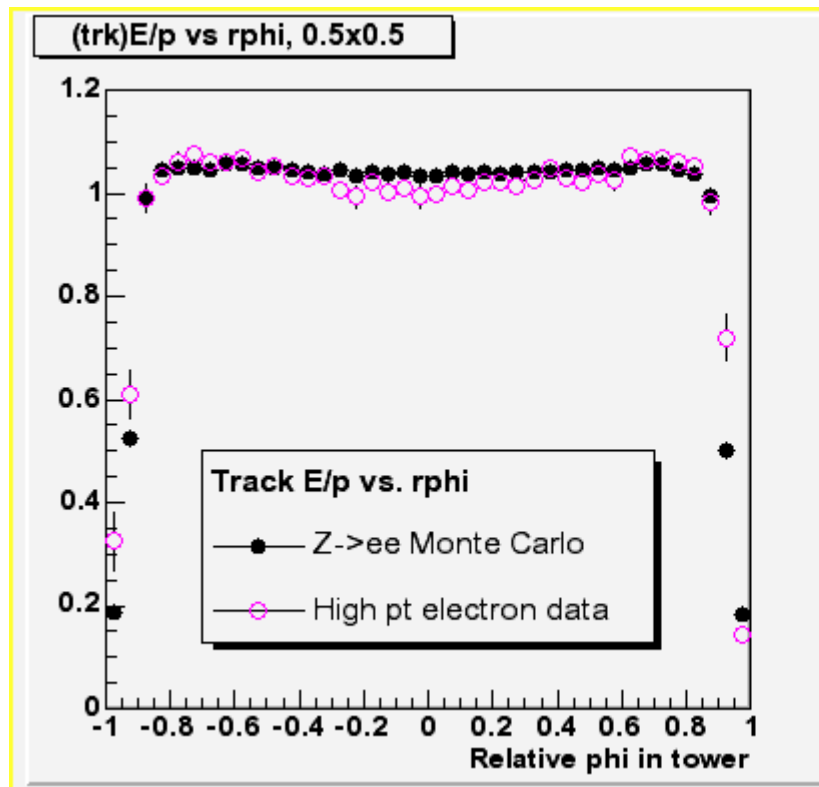 - Scaled track hit position on CES face in eta or phi direction of a tower.

$$rphi(reta) = \frac{glob\_phi(eta) - \frac{\max\_phi(eta) + \min\_phi(eta)}{2}}{\frac{\max\_phi(eta) - \min\_phi(eta)}{2}}$$

Track E/p vs. relative phi

Monte Carlo
Data

Difference = (data)E/p – (mc)E/p
_____
(mc)E/p
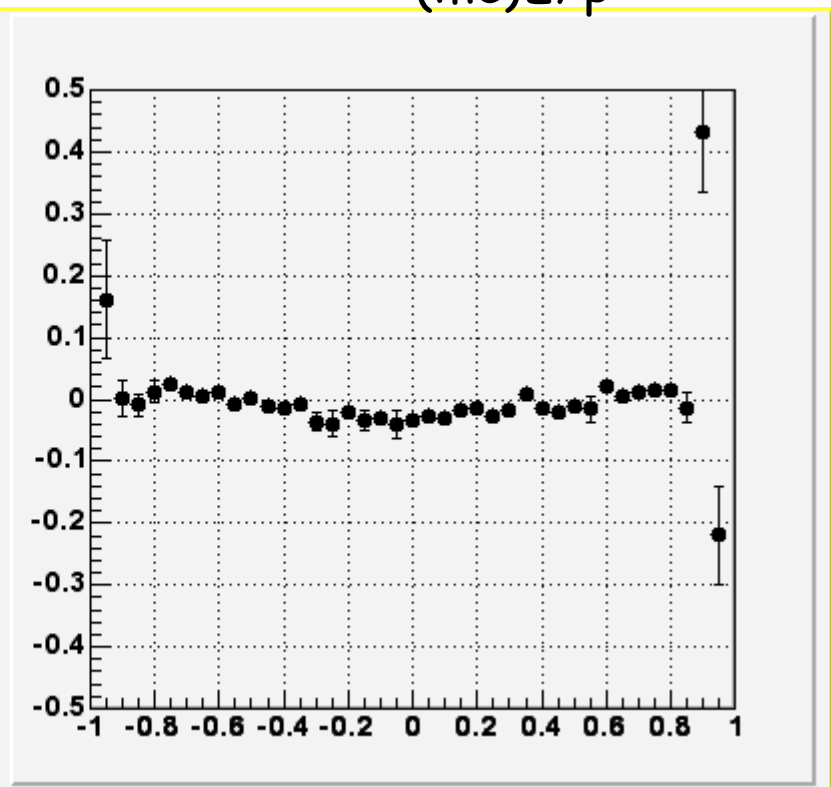
Track E/p vs. relative eta
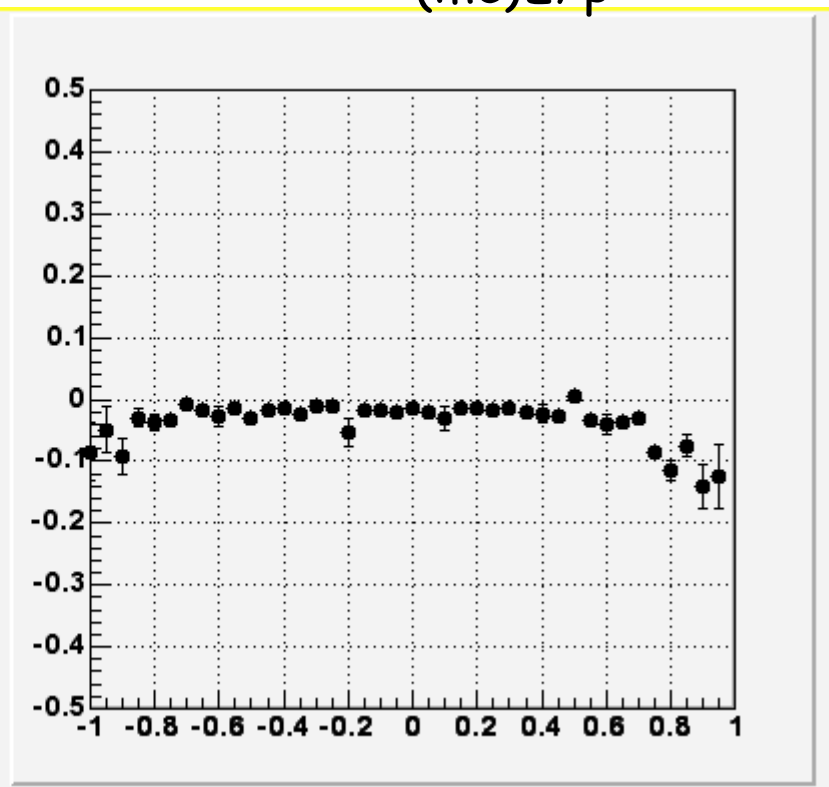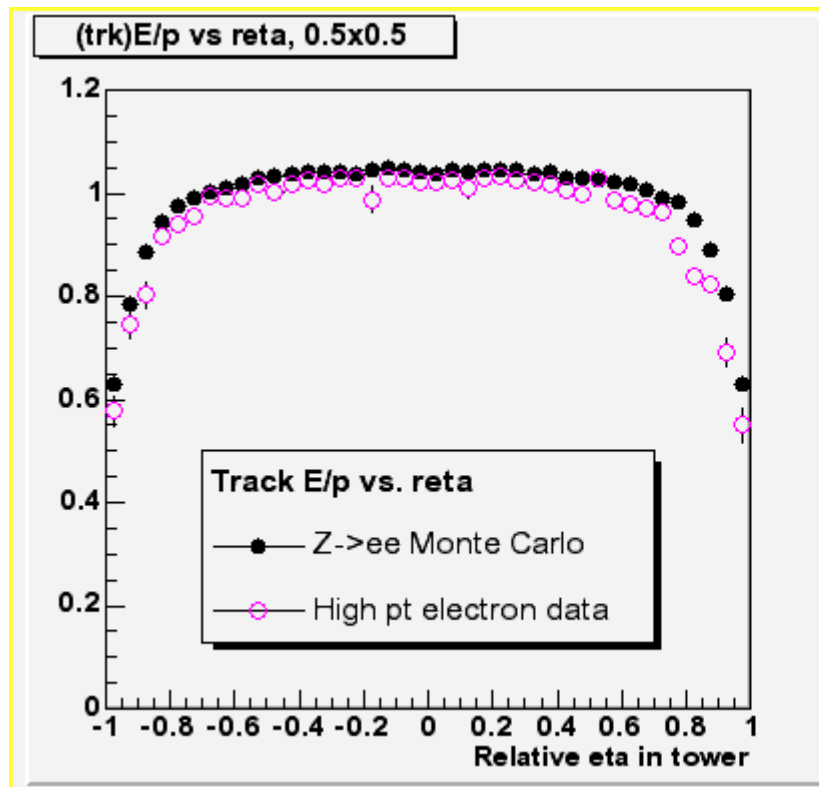
Monte Carlo
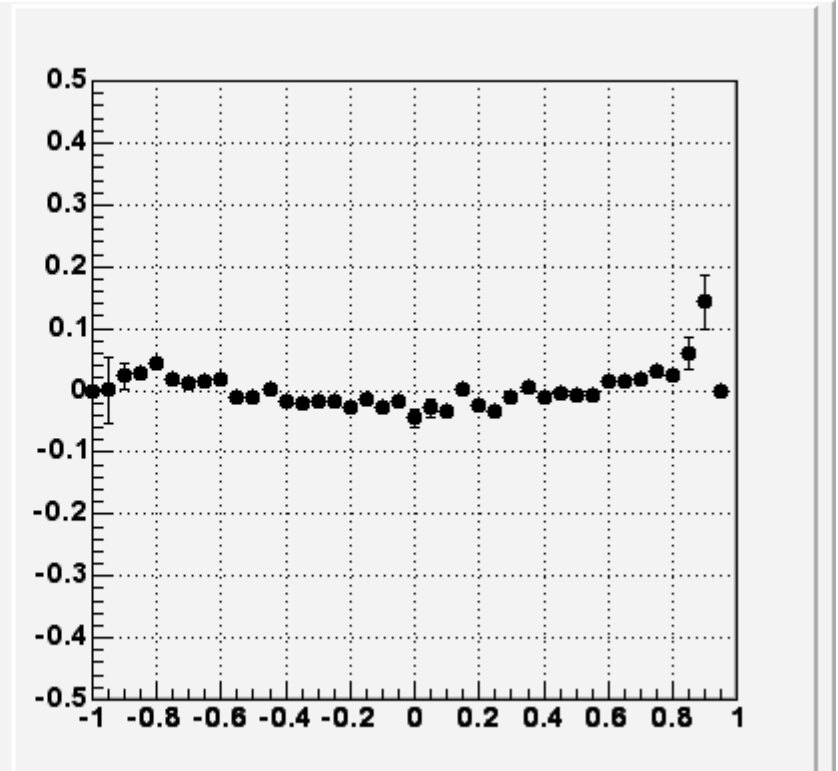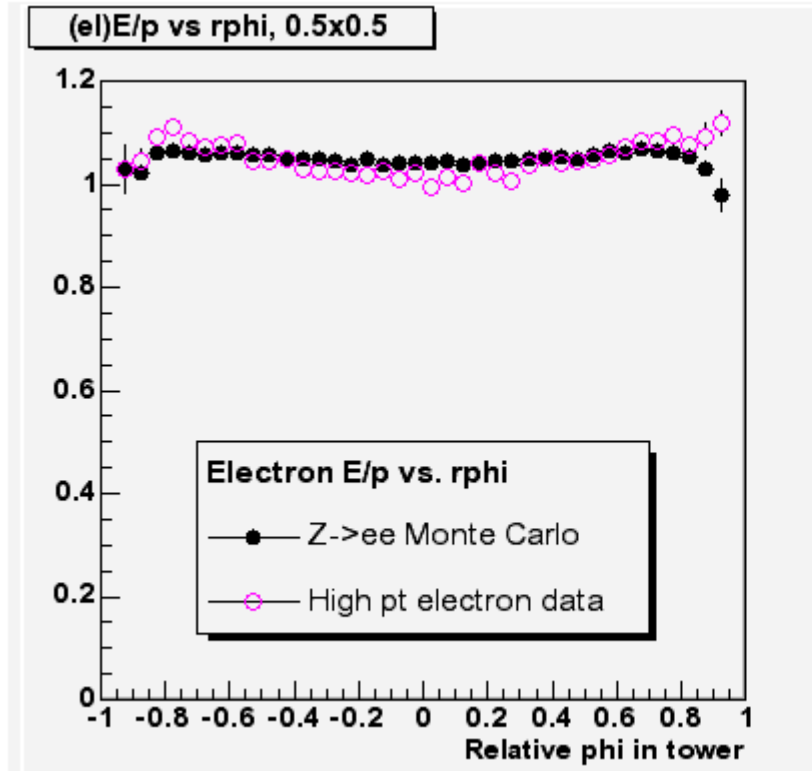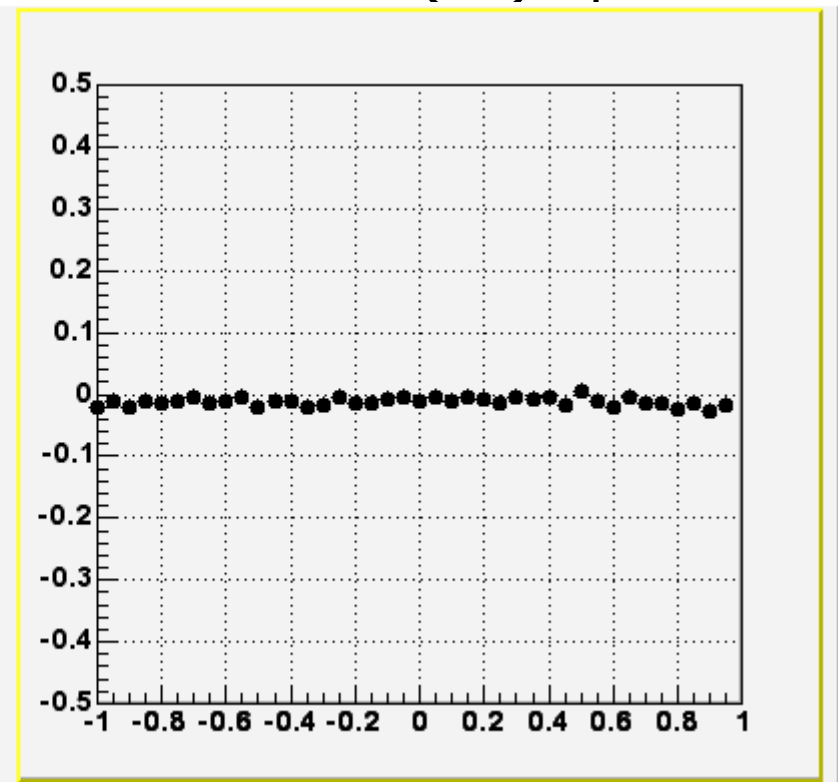
Data

Difference = $\dfrac{\text{(data)}E/p - \text{(mc)}E/p}{\text{(mc)}E/p}$

Electron E/p vs. relative phi

Monte Carlo
Data

Difference = $\dfrac{(data)E/p - (mc)E/p}{(mc)E/p}$

(el)E/p vs rphi, 0.5x0.5

Electron E/p vs. rphi

•—— Z->ee Monte Carlo

o—— High pt electron data

Relative phi in tower

Electron E/p vs. relative eta

Monte Carlo

Data

Difference = $\dfrac{(data)E/p - (mc)E/p}{(mc)E/p}$
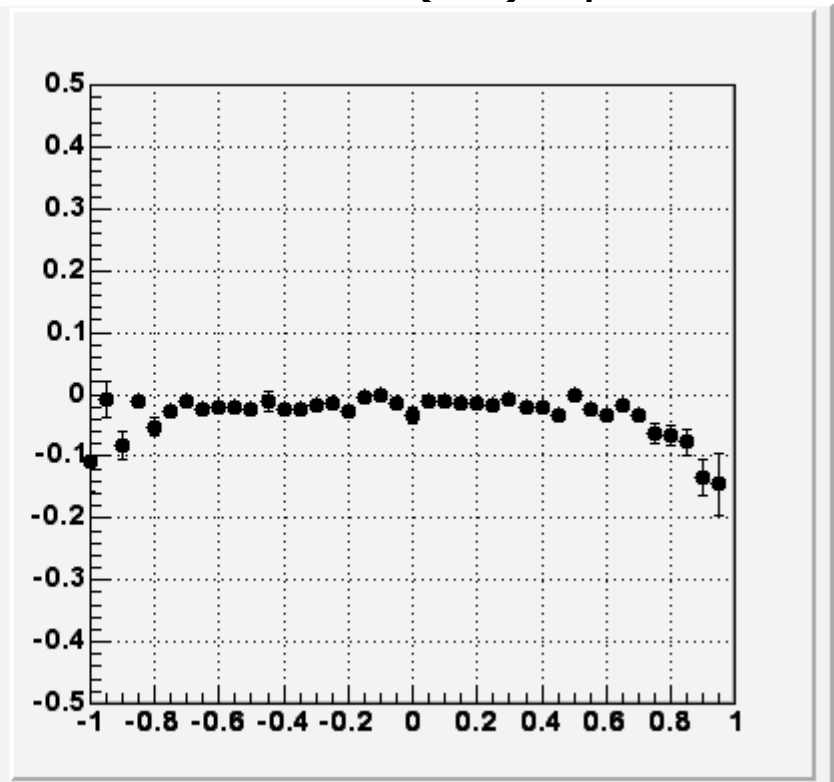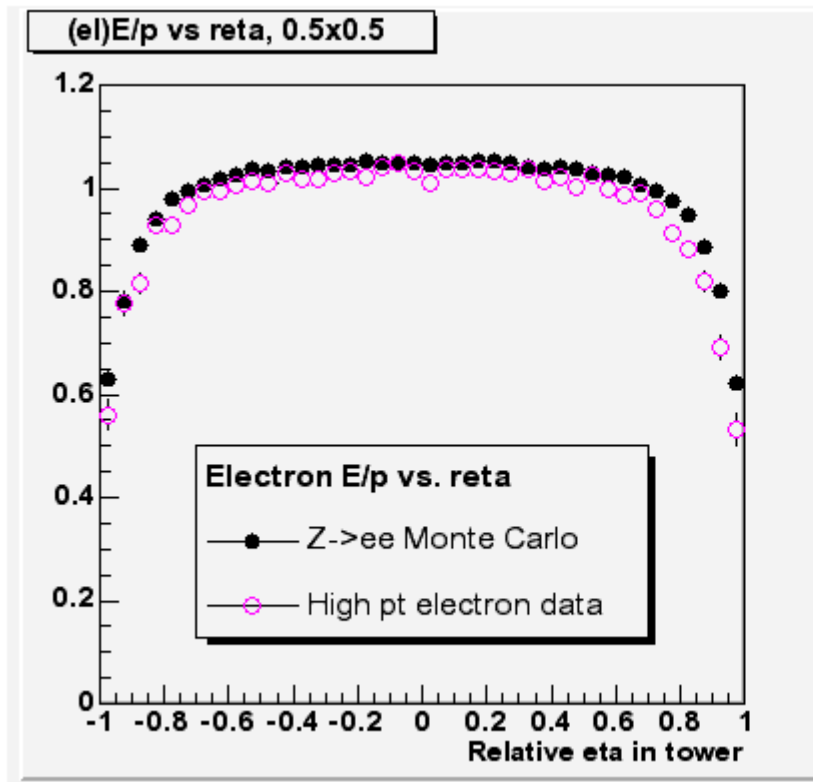
Em object E/p vs. relative phi

Monte Carlo

Data

Difference = (data)E/p – (mc)E/p

$$\text{Difference} = \frac{(\text{data})E/p - (\text{mc})E/p}{(\text{mc})E/p}$$
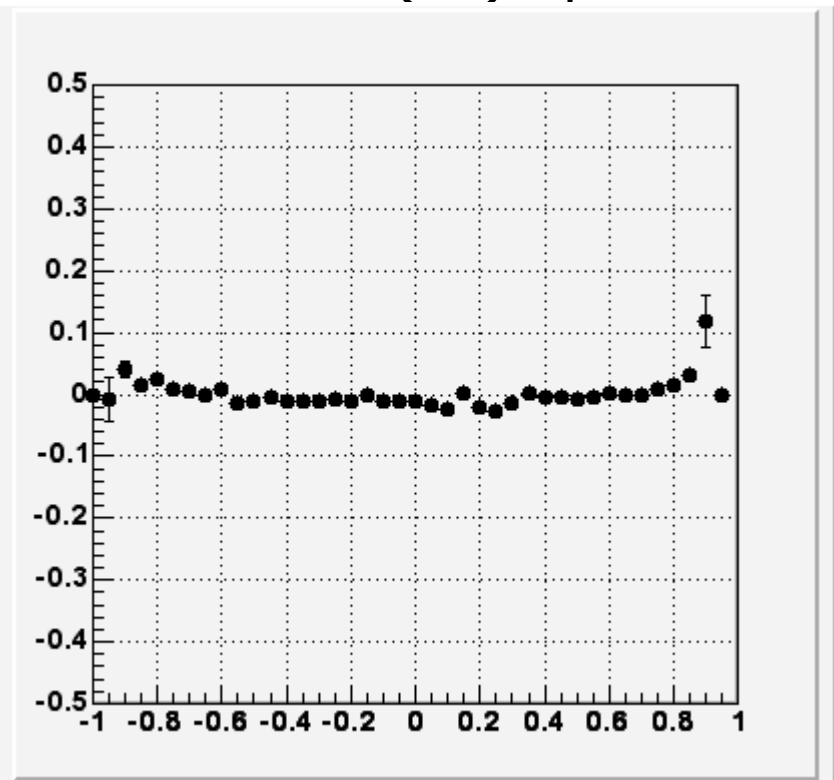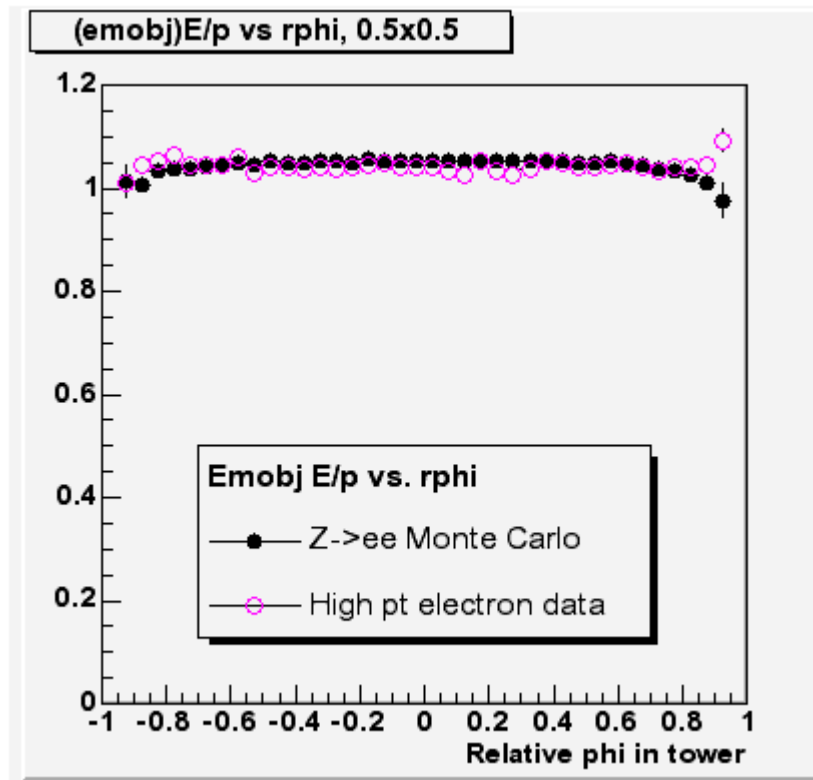
Em object E/p vs. relative eta
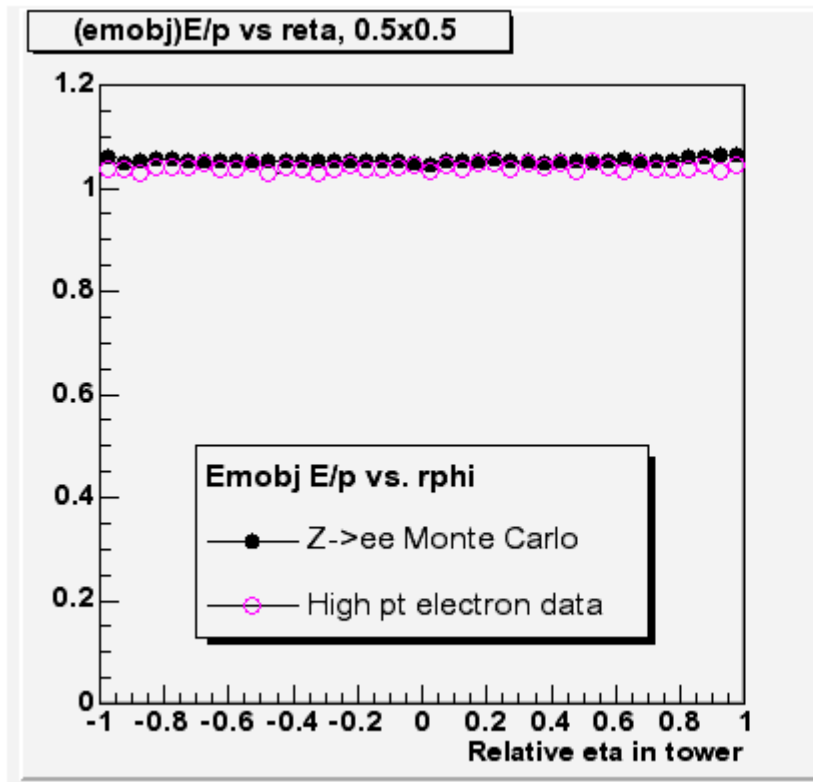
Monte Carlo
Data

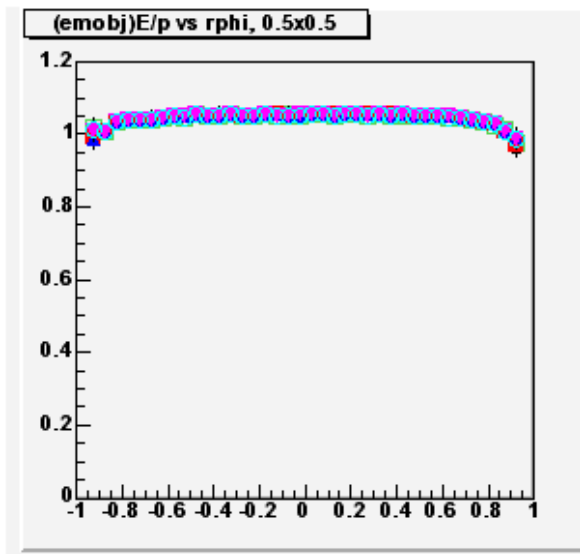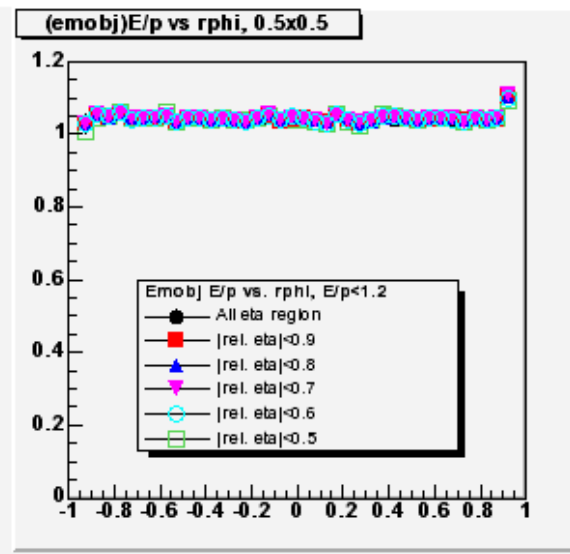Difference = $\dfrac{(data)E/p - (mc)E/p}{(mc)E/p}$

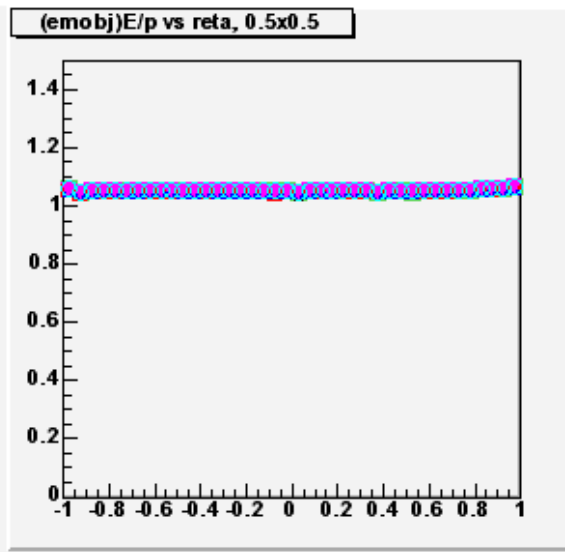# Good region dependence
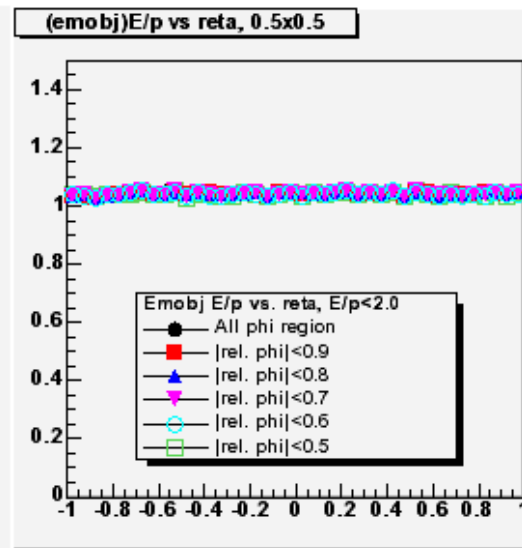# in E/p vs. emobject phi

MC   Data   Difference
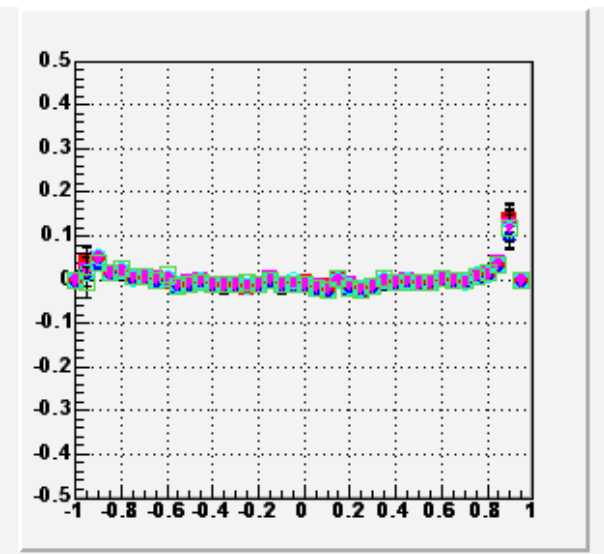
Good region dependence in E/p vs. emobject eta
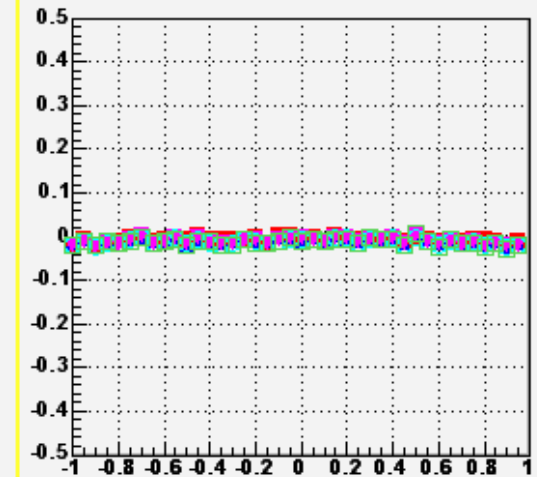

MC

Data

Difference

Conclusion.

- No background study is done for this study.
- Comparing single tower energy divided by momentum of Monte Carlo with data shows a couple of % difference in central region but more discrepancy in high reta(rphi) region. Emobject shows good agreement between Monte Carlo and data.
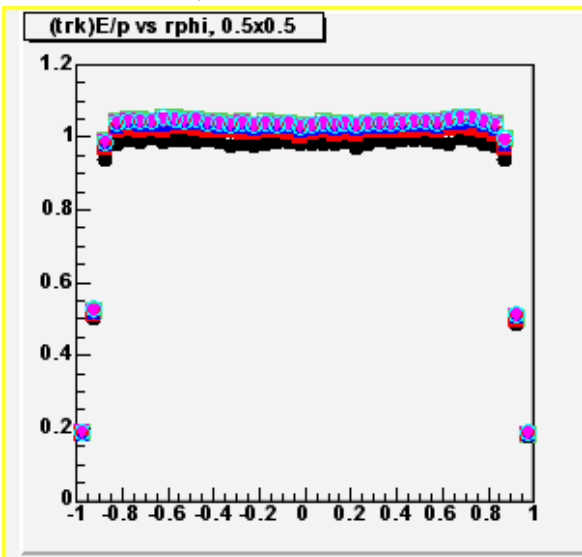- After reconstruction, the Monte Carlo agrees with data well by checking the E/p from emobject. Map or leakage correction for Cal data?
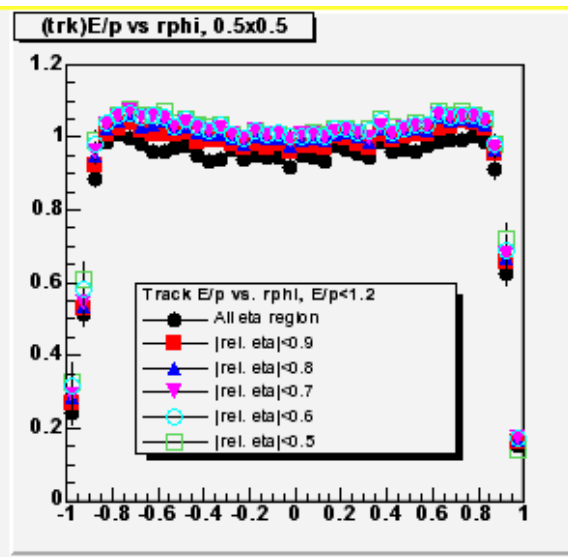
Backup plots

Zmass with different E/p cut
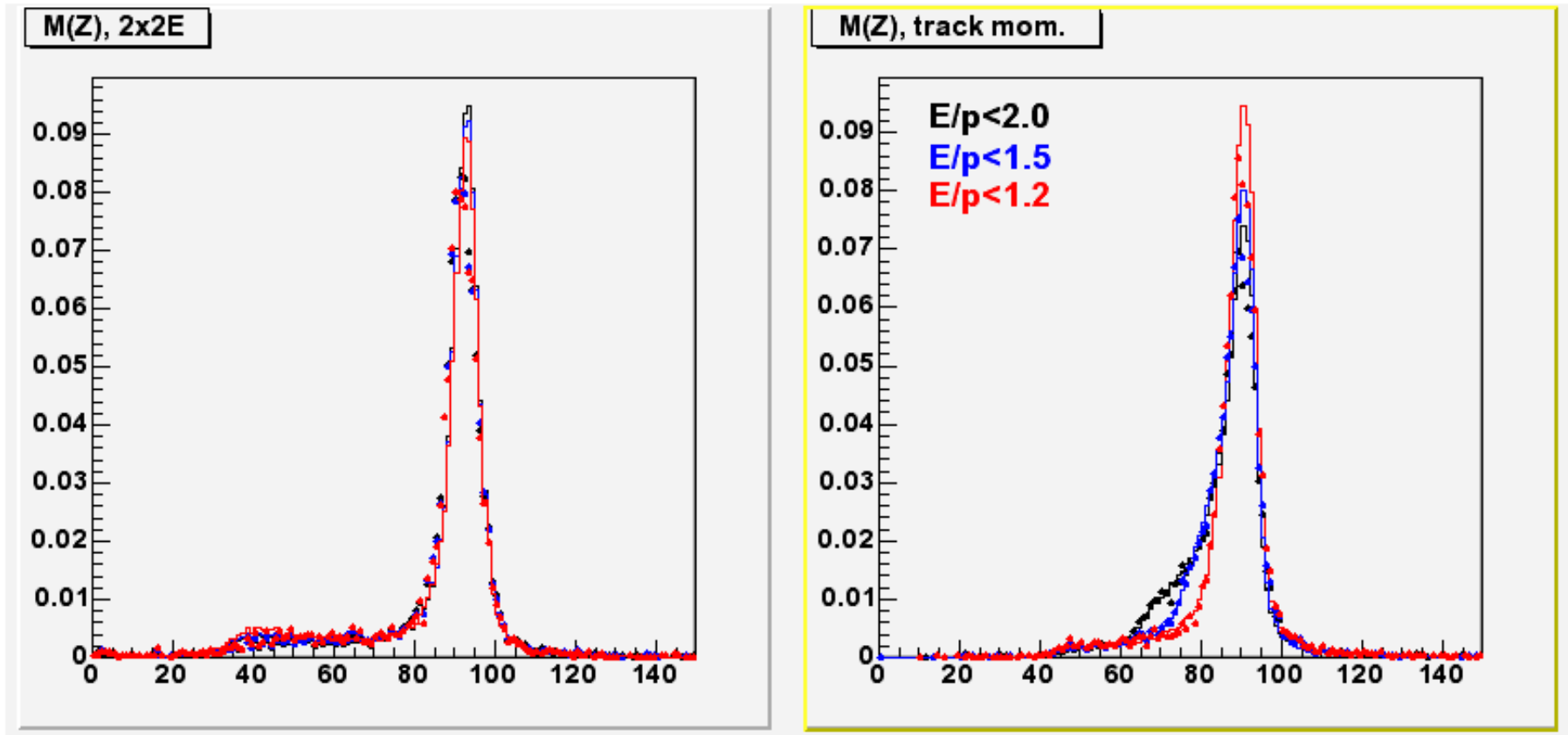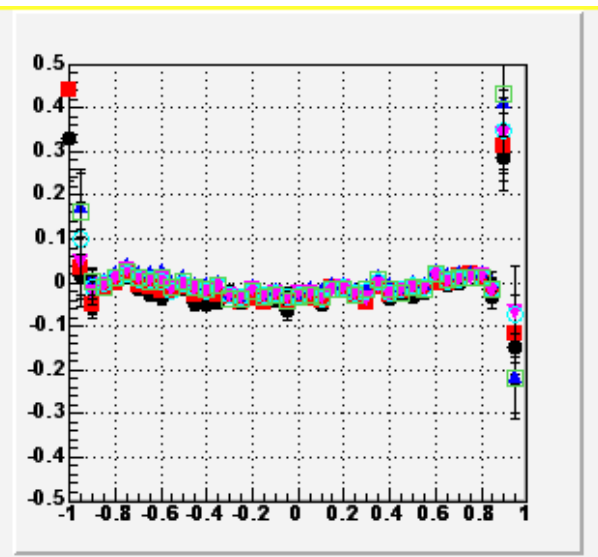
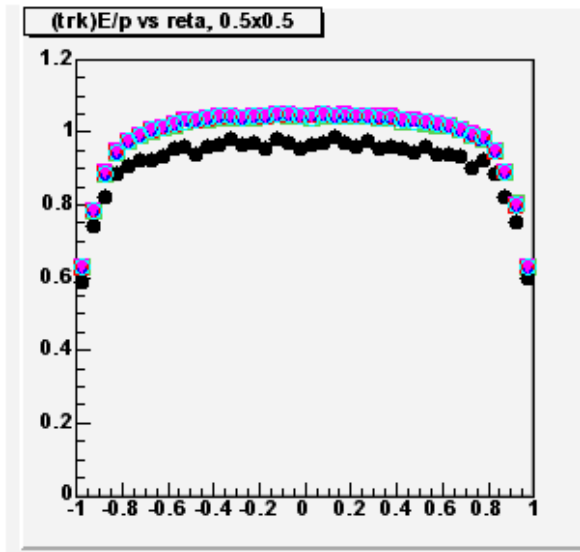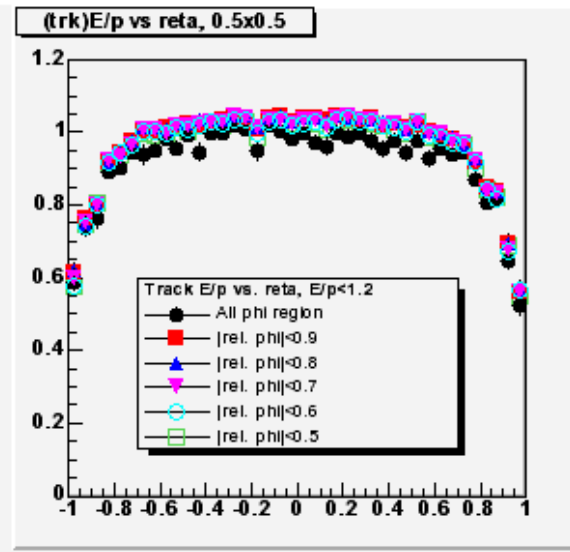# Good region dependence in E/p vs. track rphi

MC   Data   Difference
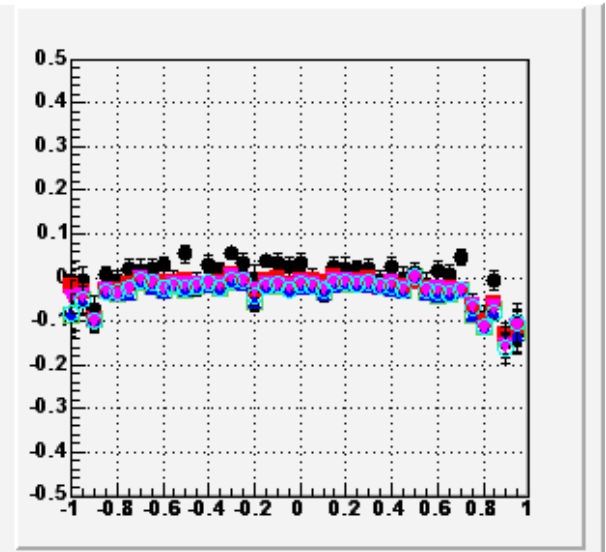
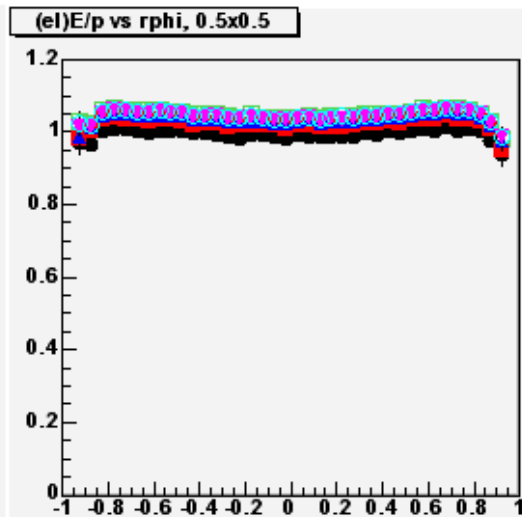# Good region dependence in E/p vs. track reta
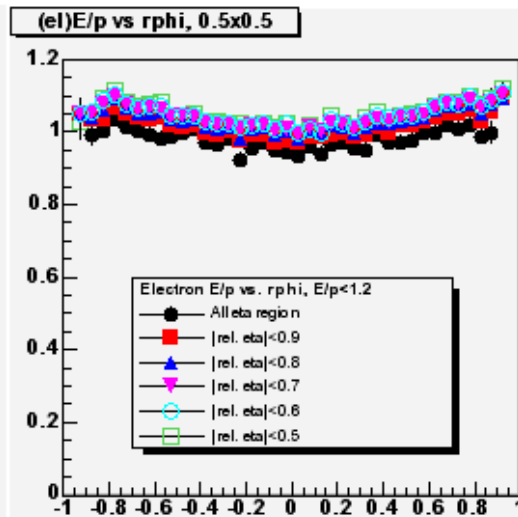
MC

Data

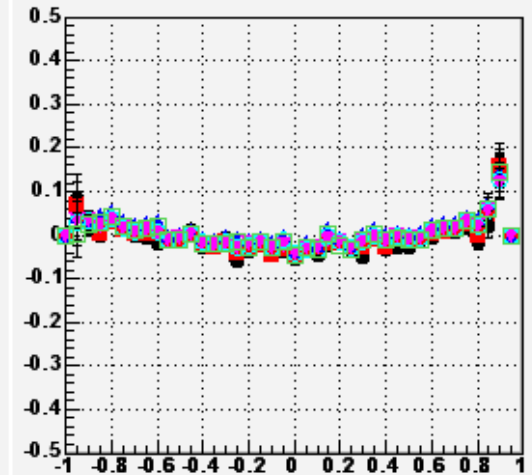### Difference

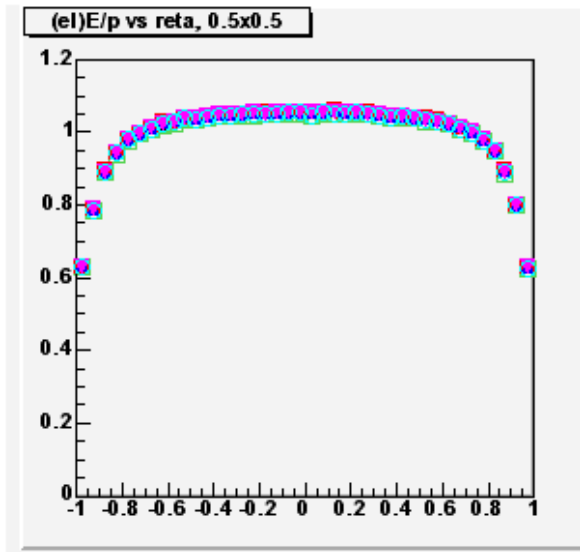# Good region difference in E/p vs. electron rphi
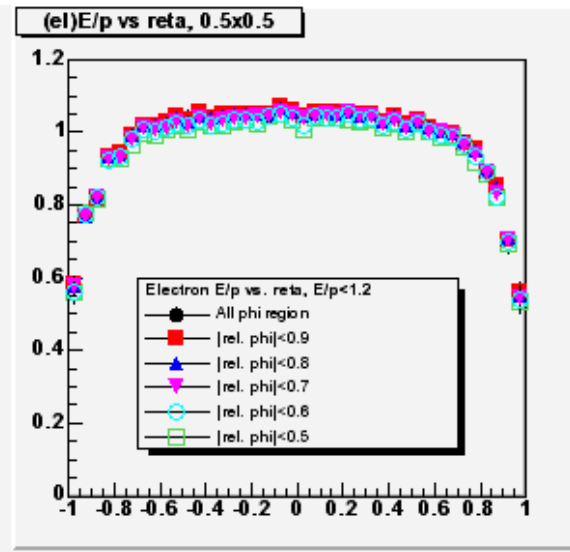
MC

Data

Difference

Good region dependence
in E/p vs. electron reta
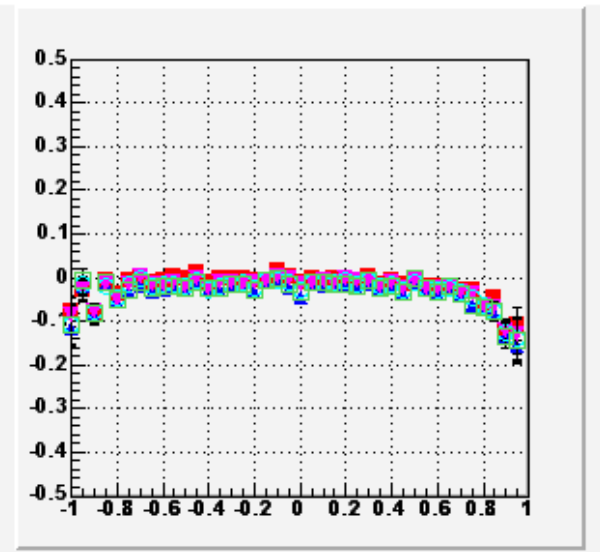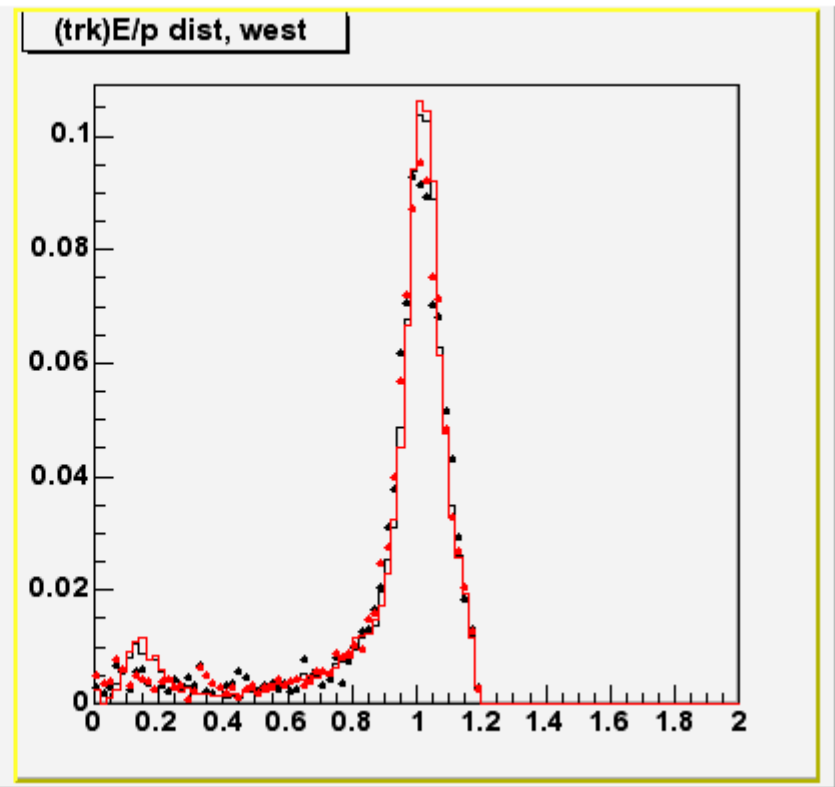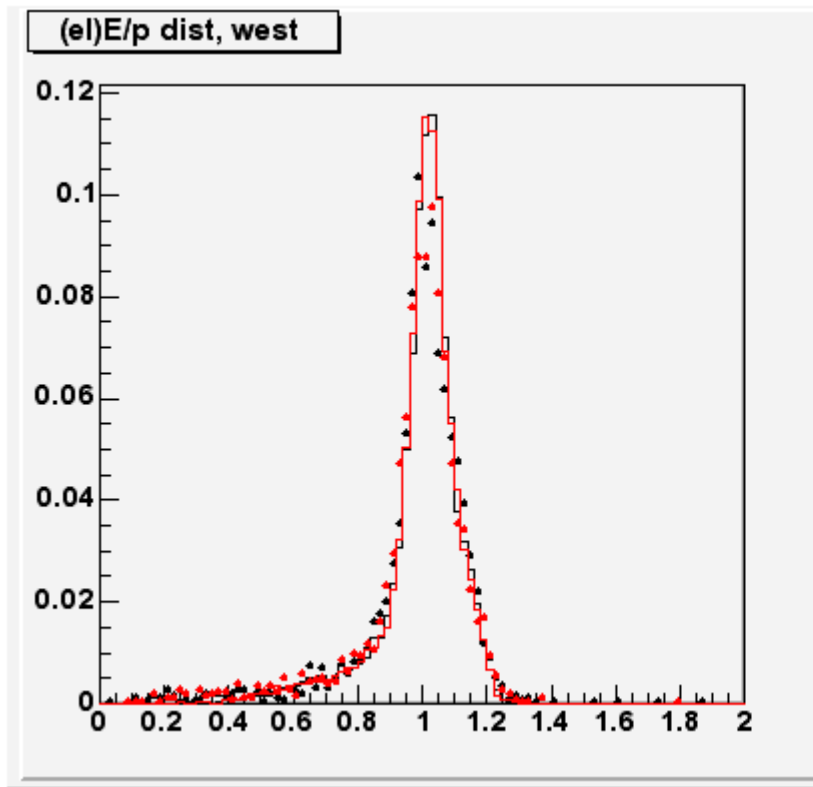
MC
Data
Difference

E/p of west and east calorimeter

West & East   Monte Carlo described in line and Data in marker
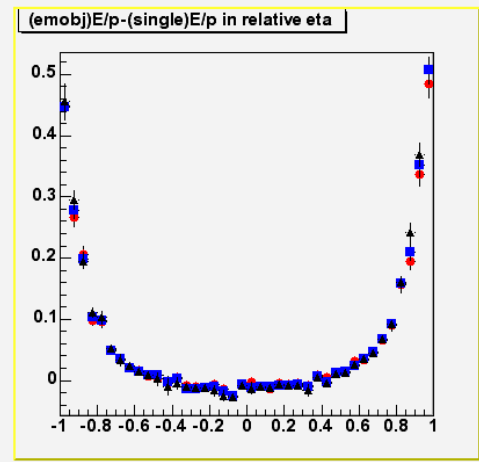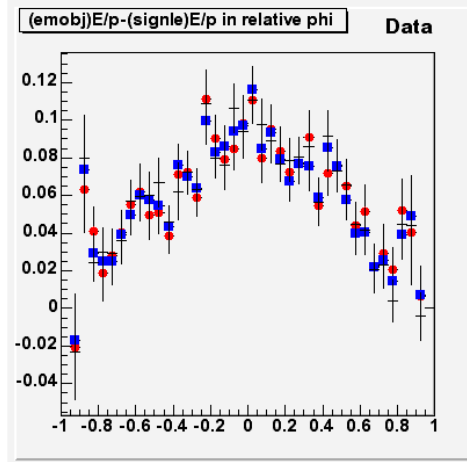
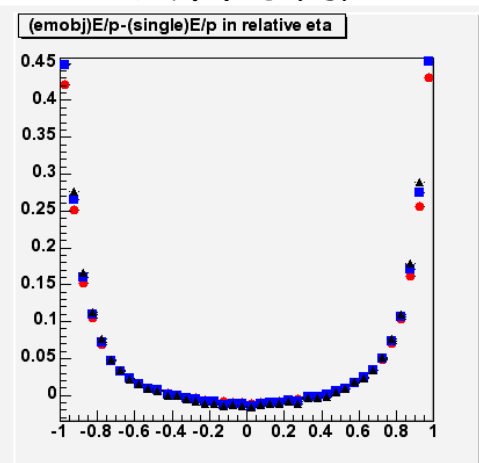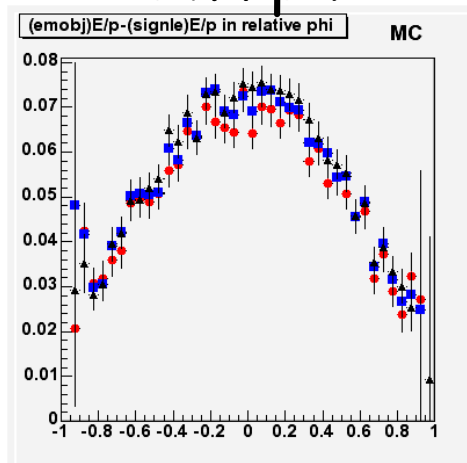# Emobject E/p – single E/p

In rphi   In reta

Monte Carlo

E/p<2.0
E/p<1.5
E/p<1.2

Data

Zmass vs. relative phi

Monte Carlo
Data

E/p<2.0